

WHAT IS CLAIMED IS:

1                   1. A disk storage device comprising:  
2                   an information storing disk;  
3                   a head for writing data to tracks on said disk and/or reading data from tracks on  
4 said disk;  
5                   a head-moving mechanism that moves said head in response to an input signal;  
6                   a head-position measuring circuit that generates a head-position signal  
7 representing a radial position of said head relative to said disk;  
8                   a current feedback amplifier;  
9                   a voltage feedback amplifier; and  
10                  a controller that is configured to:  
11                      generate a drive signal using a desired track-position signal and said head-  
12 position signal generated by said head-position measuring circuit,  
13                      set an upper limit on said drive signal,  
14                      monitor said head-position signal, or a signal derived from said head-  
15 position signal, to determine whether a malfunction condition exists, and  
16                      in the event of determining that a malfunction condition exists, causing  
17 said drive signal to be applied as an input to said voltage feedback amplifier and causing  
18 an output from said voltage feedback amplifier to provide said input signal to said head-  
19 moving mechanism, or  
20                      in the event of determining that a malfunction condition does not exist,  
21 causing said drive signal to be applied as an input to said current feedback amplifier and  
22 causing an output from said voltage feedback amplifier to provide said input signal to  
23 said head-moving mechanism.

1                   2. The disk storage device of claim 1 wherein said signal derived from said head-  
2 position signal includes one or more of a positioning error signal, a speed signal or a speed error  
3 signal.

1                   3. The disk storage device of claim 1 wherein said malfunction condition is due  
2 to defects in said disk or troubles in said head when said head is moved for seeking and tracking.

1                   4. The disk storage device of claim 1 wherein said malfunction condition is an  
2 instability of said head-position signal or said signal derived from said head-position signal.

1                   5. A disk storage device comprising:  
2 an information storing disk;  
3 a head for writing data to tracks on said disk and/or reading data from tracks on  
4 said disk;  
5 a head support mechanism supporting and moving said head;  
6 a voice-coil motor for driving said head support mechanism;  
7 a head-position measuring circuit for measuring a radial position of said head  
8 relative to said disk;  
9 a controller that calculates a drive signal on the basis of a desired track-position  
10 signal and a measured head-position signal measured by said head-position measuring circuit and  
11 sends out said drive signal for positioning said head at a position corresponding to a desired  
12 track; and  
13 a drive circuit driven by said drive signal for positioning said head at a position  
14 corresponding to said desired track by driving said voice-coil motor;  
15 wherein:  
16 said drive circuit includes a current feedback amplifier and a voltage  
17 feedback amplifier that are capable of being used selectively,  
18 said controller is provided with a speed limiter for limiting the speed of  
19 said head to a predetermined maximum speed, and  
20 said voltage feedback amplifier of said drive circuit is used when said  
21 head-position signal is unstable, and said current feedback amplifier of said drive circuit  
22 is used when said head-position signal is a normal signal during seeking and tracking  
23 operations.

1                   6. The disk storage device of claim 5 wherein said unstable head-position signal  
2 is obtained immediately after said disk storage device is connected to a power supply.

1                   7. A disk storage device comprising:  
2 an information storing disk;

3 a head for writing data to tracks on said disk and/or reading data from tracks on  
4 said disk;  
5 a head support mechanism supporting and moving said head;  
6 a voice-coil motor for driving said head support mechanism;  
7 a head-position measuring circuit for measuring a radial positioning of said head  
8 relative to said disk;  
9 a controller that calculates a drive signal on the basis of a desired track-  
10 positioning signal and a measured head-position signal measured by said head-positioning  
11 measuring circuit and sends out said drive signal to positioning said head at a position  
12 corresponding to a desired track; and  
13 a drive circuit driven by said drive signal for positioning said head at a position  
14 corresponding to said desired track by driving said voice-coil motor;

15 wherein:

16 said drive circuit includes a current feedback amplifier and a voltage  
17 feedback amplifier that are capable of being used selectively,  
18 said controller is provided with a speed limiter for limiting the speed of  
19 said head to a predetermined maximum speed, and

20 said current feedback amplifier of said drive circuit is used when said  
21 head-position signal is a normal signal, and said voltage feedback amplifier of said drive  
22 circuit is used when said head-position signal is a malfunction signal due to defects in  
23 said disk or troubles in said head when said head is moved for seeking and tracking.

1 8. The disk storage device of claim 5, 6, or 7 wherein said speed limiter is  
2 saturated with a value obtained by dividing said product of multiplication of a predetermined  
3 maximum speed ( $V_{\max}$  (m/s)) and a counter electromotive voltage constant ( $k_f$  (V/(m/s))) of said  
4 voice-coil motor by said gain ( $K_v$  (V/V)) of said voltage feedback amplifier.

1 9. The disk storage device of claim 1, 5, 6, or 7 wherein said controller includes:  
2 a speed determining unit that provides a speed signal indicating said speed of said  
3 head by differentiating said head-position signal provided by said head-positioning measuring  
4 circuit;

5                   a desired speed determining unit that generates a desired speed signal on said  
6 basis of said head-position signal provided by said head-positioning measuring circuit and said  
7 desired track-positioning signal; and  
8                   a subtractor that generates a speed deviation signal by subtracting said output  
9 signal of said desired speed determining unit from said output signal of said speed determining  
10 unit.

1                   10. The disk storage device of claim 1, 5, 6, or 7 wherein said information  
2 storage disk is a magnetic disk.

1                   11. The disk storage device of claim 1, 5, 6, or 7 wherein said head both reads  
2 information from said disk and writes information to said disk.